

a sensor disposed adjacent said rotor for carrying magnetically produced electrical pulses;

two magnets disposed adjacent said sensor to produce magnetic fields of opposite polarity along the path of travel for the plurality of magnetically switchable elements; and

wherein as said rotor is rotated, said two magnets cause each of said magnetic elements to be magnetically switched through the four magnetic states to produce two electrical pulses in the sensor for each of the magnetic elements for each revolution of the rotor.

#### Remarks

In the Office Action of June 16, claims 1-11 were rejected under 35 U.S.C. §103 (a) as being obvious to one of ordinary skill in the art when Boden was viewed with Kurihara and Haeri.

This action was made a final action and the Haeri reference was cited for the first time.

As a result, the undersigned requested an interview with Examiner Martir and Examiner Fuller. The interview took place on Friday, August 16, and the courtesies extended by the Examiners during the interview are gratefully acknowledged.

For the reasons stated below, reconsideration and withdrawal of this rejection are respectfully requested.

The present invention relates to utility meters, such as water meters. When using water in a residence, for example, it is necessary to count and report the many gallons of water consumption used for washing, drinking and other household uses.

The invention converts mechanical movements, such as rotations, of a metering element, or of a magnetic pickup such as element 34 in Fig. 6. These rotations are converted to a series of electrical pulses, which can then be transmitted by wire and in some cases by radio to a remote location. According to claim 1, at least four pulses are generated for each revolution. As explained below, the primary reference, Boden, which has been relied on through several office actions, 1) is not a pulse transducer, 2) does not generate more than

one analog signal in any time frame, 3) works on the axial sliding of its magnets not on the rotation of its magnets and 4) has elements which completely encircle the axis of rotation and not spaced around the axis in a merry-go-round fashion (see Fig. 7 of the present application).

Boden provides two axial sleeve magnets 4, 4' which completely encircle the axis of rotation are axially spaced to measure axial, sliding movement of a turbine type rotor 2 within a pipe. The rotation of magnets 4, 4' produces no signals. Only the axial sliding movement of magnets 4, 4' produces a signal.

It is noted that during the interview, that Examiner Fuller questioned whether Applicant's magnets 29 and 30 were axially spaced. This is not part of the claim 1, and in fact upon further review, they are not axially spaced along the axis of rotation, they are laterally spaced from the axis of rotation. In contrast, Boden's magnets completely encircle the axis of rotation.

This axial movement of magnets 4, 4' provides a feedback signal to circuit 7 which activates an electromagnet 5' to urge the rotor 2 back to a certain axial position. This has no relevance to the present invention. This feedback signal is not a pulse and does not produce a series of pulses in Boden.

The Office Action places reliance on Boden's axial sleeves for meeting the following language of claim 1 before the amendment:

"a rotor having an axis of rotation and having a plurality of magnetically switchable elements spaced around the axis and movable along a path of travel around the axis, each of said magnetically switchable elements having at least four magnetic states."

Applicant has urged that Boden's sleeves completely encircle the axis so as not to be spaced around the axis. The sleeves 4, 4' rotate with the Boden rotor 2, but this rotation produces no magnetic switching or pulse generation. The magnets in Boden do not have any magnetically switchable states.

The final action responds by saying that Boden has magnets "around" its axis and movable along "a path of travel" (Office action, page 2, paragraph 4, line 2.) This, however, does not respond to Applicant's position, that Applicant's path of travel is around the axis of rotation, and that Boden's magnets being continuous in encircling the axis of rotation, do not provide a plurality of magnets spaced around the axis and would not generate any plurality of pulses as a result of moving on a path of travel around the axis.

It is Applicant's position that the terms "spaced around the axis" and "movable along a path of travel around the axis" are sufficient to describe a circular or elliptical path around the axis of rotation.

Nevertheless, during the Interview, the Examiners suggested that the language "spaced apart" would help clarify claim 1.

The undersigned's view is that "apart" is redundant to "spaced" in this instance, however, in the spirit of compromise, an amendment to claim 1 has been offered to clarify the language to read "spaced apart" and spaced around the axis if this helps the understanding of the claim.

Claim 1 further recites:

"a sensor disposed adjacent said rotor for carrying magnetically produced electrical pulses;

two magnets disposed adjacent said sensor to produce magnetic fields of opposite polarity along the path of travel for the plurality of magnetically switchable elements;"

The two magnets of opposite polarity along the orbital path of travel provide the two pulses per revolution. The Office Action also acknowledges that Boden doesn't show or suggest the following subject matter:

"wherein as said rotor is rotated, said two magnets cause each of said magnetic elements to be magnetically switched through the four magnetic states to produce two electrical pulses in the sensor for each of the magnetic elements for each

revolution of the rotor." (double density)

The Office Action cites Kurihara as showing an example of a magnetically switchable element. There is no way apparent to the undersigned that magnetically switchable element of Kurihara can be placed in Boden's rotor 2. Assuming that they were used to replace the magnets 4, 4', Boden's sensors would have to be re-engineered, but for what purpose, when the goal in Boden is simply to produce a single feedback signal.

Haeri shows a device in which multiple magnets are positioned on a rotor and the rotor is rotated past a reed switch sensor 18 which generates switch pulses from opening and closing.

In Haeri, each element simply generates only one switch closure per revolution as it passes by the Hall sensor (single density), which would only generate one pulse for each element per revolution (single density). Four magnets cause four switch closures, wherein the present invention would provide eight pulses from four elements on its rotor (double density).

The present invention is a totally nonobvious departure from Haeri and other references of record, which basically show a plurality of magnets (N-S) on a cylinder (other art uses a disc) and a reed switch to sense the passage of the magnets. This is similar to the magnetic pickup 34 in Fig. 6, and replacing element 33 with a reed switch. This technology is well known in the meter art.

The present invention is unique in putting 2 to 5 elements such as reed switch 18 on the rotating device and eliminating the wires of reed switch 18 due the combination of the 1) magnetically switched elements 2) the two magnets and the 3) sensing coil.

The present invention is the only invention to double the density of pulses (i.e. generating four pulses from 2 magnetic switches per revolution). The prior art needs twice as many magnets as Applicant's magnetically switchable elements.

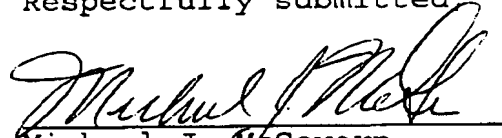
Regarding claims 13 and 15, these were rejected under 35 U.S.C. §103 (a) over Boden in view of Kurihara in further view Evans et al., U.S. Pat. No. 4,200,785. Evans was cited as showing a pulse transducer for a register as applied to a gas

pump. Evans already has N and S permanent magnetic elements (Fig. 3) that are arranged around a wheel or a disc which is rotated past a reed switch that again senses the presence of the N and S magnetic elements. Evans does not provide a plurality of magnetically switchable elements in a rotor, meaning a magnetic element that switches between two or more magnetic states in response to magnetic flux. Evans merely puts magnets on a wheel and passes them by a switch like Haeri, but using a disc instead of a barrel-shaped rotor. Evans teaches no more than prior utility meter art before the present invention.

#### Conclusion

The prior art rejections are believed to incorrect and without engineering and legal support for the reasons stated above. After this response, claims 1-15 are still pending and a Notice of Allowance for these claims is respectfully requested.

Respectfully submitted



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## Manual of Patent Examining Procedure, Section 713.04 Substance of Interview must Be Made of Record

Except as otherwise provided, a complete written statement as to the substance of any face-to-face or telephone interview with regard to an application must be made of record in the application, whether or not an agreement with the examiner was reached at the interview.

### §1.133 Interviews

(b) In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111 and 1.135. (35 U.S.C. 132)

§ 1.2. Business to be transacted in writing: All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete a two-sheet carbon interleaf Interview Summary Form for each interview held after January 1, 1978 where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks in neat handwritten form using a ball point pen. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, pointing out typographical errors or unreadable script in Office actions or the like, or resulting in an examiner's amendment that fully sets forth the agreement are excluded from the interview recordation procedures below.

The Interview Summary Form shall be given an appropriate paper number, placed in the right hand portion of the file, and listed on the "Contents" list on the file wrapper. In a personal interview, the duplicate copy of the Form is removed and given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephonic interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication.

The Form provides for recordation of the following information:

- Application Number of the application
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (personal or telephonic)
- Name of participant(s) (applicant, attorney or agent, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the claims discussed
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). (Agreements as to allowability are tentative and do not restrict further action by the examiner to the contrary.)
- The signature of the examiner who conducted the interview
- Names of other Patent and Trademark Office personnel present.

The Form also contains a statement reminding the applicant of his responsibility to record the substance of the interview.

It is desirable that the examiner orally remind the applicant of his obligation to record the substance of the interview in each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check a box at the bottom of the Form informing the applicant that he need not supplement the Form by submitting a separate record of the substance of the interview.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview:

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner. The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he feels were or might be persuasive to the examiner,
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete or accurate, the examiner will give the applicant one month from the date of the notifying letter to complete the reply and thereby avoid abandonment of the application (37 CFR 1.135(c)).

### Examiner to Check for Accuracy

Applicant's summary of what took place at the interview should be carefully checked to determine the accuracy of any argument or statement attributed to the examiner during the interview. If there is an inaccuracy and it bears directly on the question of patentability, it should be pointed out in the next Office letter. If the claims are allowable for other reasons of record, the examiner should send a letter setting forth his or her version of the statement attributed to him. If the record is complete and accurate, the examiner should place the indication "Interview record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.